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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/070,288	02/28/2002	Naoki Nakanishi	10873.887USWO	4606

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EXAMINER

AGUSTIN, PETER VINCENT

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<p>Application No.</p> <p align="center">10/070,288</p>	<p>Applicant(s)</p> <p align="center">NAKANISHI ET AL.</p>	
	<p>Examiner</p> <p align="center">Peter Vincent Agustin</p>	<p>Art Unit</p> <p align="center">2652</p>	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 March 2005 and 22 July 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9, 11 and 16-23 is/are pending in the application.
- 4a) Of the above claim(s) 22 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11 and 16-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-9, 11 and 16-23 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/6/05</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 1-9, 11 & 16-23 are now pending.

#### *Continued Examination Under 37 CFR 1.114*

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 29, 2005 has been entered.

#### *Election/Restrictions*

3. Applicant's election of Group I, claims 1-9, 11 & 16-21 in the reply filed on July 22, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
4. Claims 22 & 23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on July 22, 2005.
5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Information Disclosure Statement***

6. The information disclosure statement (IDS) submitted on April 6, 2005 was filed after the mailing date of the final Office Action on December 29, 2004. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Objections***

7. Claim 11 is objected to because it is missing the equation  $r \leq d \times \tan(\sin^{-1}(NA))$  as originally recited.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 3-9, 11 & 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3-9 recite the limitation "the first diffraction grating" on e.g., claim 3, line 2. There is insufficient antecedent basis for this limitation in the claims.

Claim 11, last two lines define the value  $r$  which "represents a distance from a point at which the optical axis and the emitted beam dividing portion cross each other on the emitted beam dividing portion". The claimed "distance" should involve a length measured from a first point to a second point. While the Applicant recites a first point, i.e., "a point at which the optical axis and the emitted beam dividing portion cross each other on the emitted beam dividing

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portion”, there is no mention of a second point which is necessary to completely define the claimed “distance”. Therefore, the definition is incomplete, which renders the claim indefinite.

Claim 20 recites “the emission point”. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 2, 9, 11 & 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki (US 5,608,695).

In regard to claim 1, Yamazaki discloses an optical semiconductor device (Figure 6) comprising: a laser element (29); an emitted beam dividing portion (28b) for dividing an emitted light beam from the laser element into a main beam and two sub beams (Note: Figure 2, element 8a is a grating that divides the laser beam into 0-order, +1-order & -1-order beams (see column 2, lines 1-7). Figure 6 is an improvement of Yamazaki’s invention over the prior art shown in Figure 2; therefore, element 28b of Figure 6 is understood to have the same property as element 8a of Figure 2); a reflected beam dividing portion (28a) for dividing a reflected light beam from an information recording medium into light beams in different focused states; servo-signal-detecting photodetector elements (Figure 7, elements 31 & 34; column 5, line 15) for receiving the reflected light beams obtained by the division by the reflected beam dividing portion in a defocused state; and a signal-detecting photodetector element (Figure 7, elements 32 & 33) for

receiving a reflected light beam obtained by diffracting with the emitted beam dividing portion a reflected light beam that has passed through the reflected beam dividing portion, wherein the emitted beam dividing portion includes a first diffraction grating region for generating the main beam, and second and third diffraction grating regions for generating the sub beams (the claimed regions correspond to the respective regions of element 28b that emit the 0, -1 & +1 order beams).

In regard to claim 2, Yamazaki discloses that the first diffraction grating region is positioned between the second and third diffraction grating regions (understood from “single main beam and two sub-beams” on column 1, lines 27-28; it is known in the art that two sub-beams are arranged on opposite sides of a main beam, which suggests the claimed arrangement of diffraction grating regions), and the second and third diffraction grating regions have the same grating arrangement direction which is different from a grating arrangement direction of the first diffraction grating region (understood from the fact that the first diffraction grating region emits a 0-order light and the second and third diffraction grating regions both emit light of order 1 but with opposite powers).

In regard to claim 9, Yamazaki discloses that the first diffraction grating is composed of a plurality of diffraction grating regions that divide a spot of the reflected light beam equally (see Figure 7, elements 35, 36, 37 & 38).

In regard to claim 11, Yamazaki discloses (as best interpreted by the Examiner in light of the 112-2<sup>nd</sup> paragraph rejection above) that when the emitted beam dividing portion (28b) is positioned on an optical axis extending between an emission point of the laser element (29) and a main spot formed via an objective lens (Figure 5, element 22) on the information recording

medium (23), the reflected light beam from the foregoing information recording medium entering a region satisfying a formula shown below is divided so as to be collected on the signal-detecting photodetector element:  $r \leq d \times \tan(\sin^{-1}(NA))$  where:  $d$  represents an air-equivalent distance from the emission point of the laser element to the emitted beam dividing portion;  $NA$  represents a numerical aperture of the objective lens; and  $r$  represents a distance from a point at which the optical axis and the emitted beam dividing portion cross each other on the emitted beam dividing portion.

Claim 16 has limitations similar to those of claim 1; thus, it is rejected on the same basis. Furthermore, in regard to claim 16, Yamazaki discloses an optical information processing device (Figures 5 & 6) comprising: an optical system (22) for guiding the light beams obtained by the division by the emitted beam dividing portion to an information recording medium; and the information recording medium (23).

### *Claim Rejections - 35 USC § 103*

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 3 & 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Katayama (US 6,894,958).

For a description of Yamazaki, see the rejections above. However, Yamazaki does not explicitly disclose: in regard to claim 3, that two diffracted light beams of the same order diffraction by the first diffraction grating are subjected to the diffraction with different

diffraction efficiencies, and the diffracted light beam having the higher diffraction efficiency is received by the signal-detecting photodetector element; and in regard to claim 4, that each grating in the first diffraction grating is of an inclined type having a step-like cross-sectional shape or a triangular cross-sectional shape.

Katayama discloses: in regard to claim 3, that two diffracted light beams of the same order diffraction with different diffraction efficiencies (last three lines of abstract), and the diffracted light beam having the higher diffraction efficiency is received by a signal-detecting photodetector element (abstract, lines 6-8: note "data signal"); and in regard to claim 4, that each grating is of an inclined type (Figure 12) having a step-like cross-sectional shape (Figure 13A) or a triangular cross-sectional shape. It would have been obvious to one of ordinary skill in the art at the time of the invention by the Applicant to have applied the teachings of Katayama to the device of Yamazaki, the motivation being to provide an optical head apparatus capable of realizing high S/N with respect to a data signal and a tracking error signal (column 4, lines 47-54), thereby enabling accurate reproduction of data.

14. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Opheij et al. (US 4,918,679).

For a description of Yamazaki, see the rejections above. Furthermore, in regard to claim 5, Yamazaki discloses that the first diffraction grating is composed of gratings; however, Yamazaki is silent to whether each of the gratings is in a curved line form.

Opheij et al. disclose gratings in a curved line form (see Figures 7 & 8). It would have been obvious to one of ordinary skill in the art at the time of the invention by the Applicant to have used the curved gratings of Opheij et al. for the emitted beam dividing portion of



Yamazaki, the motivation being to ensure high quality imaging of the radiation source in the scanning spot of the optical recording medium (column 3, lines 18-27).

15. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Heemskerk (US 4,665,310).

For a description of Yamazaki, see the rejections above. However, Yamazaki does not explicitly disclose: in regard to claim 6, that the first diffraction grating is composed of a plurality of diffraction grating regions having the same diffraction efficiency; in regard to claim 7, that the first diffraction grating is composed of at least two diffraction grating regions that differ from each other in a direction in which gratings are arranged; and in regard to claim 8, that the first diffraction grating is composed of diffraction grating regions having the same grating periodic interval.

In regard to claims 6-8, Heemskerk discloses a diffraction grating (Figure 2) composed of a plurality of diffraction grating regions having the same diffraction efficiency (suggested by column 4, lines 10-15), composed of at least two diffraction grating regions (11 & 12) that differ from each other in a direction in which gratings are arranged (as shown in Figure 2), and composed of diffraction grating regions having the same grating periodic interval (column 3, lines 28-33). It would have been obvious to one of ordinary skill in the art at the time of the invention by the Applicant to have applied the teachings of Heemskerk to the diffraction grating of Yamazaki, the motivation being to provide a diffraction grating that is simple to manufacture (column 1, line 59; column 4, lines 27-30) and that prevents erroneous tracking and focusing (column 1, line 65; column 2, lines 1-3; column 4, lines 16-17) (see also column 2, lines 16-18).

16. Claims 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Hasegawa et al. (US 5,881,043).

For a description of Yamazaki, see the rejections above. Furthermore, Yamazaki discloses: in regard to claim 18, that a pair of the servo-signal-detecting photodetector elements (Figure 7, elements 31 & 34) are arranged symmetrically with respect to an optical axis, and the signal-detecting photodetector element (32 or 33) is arranged at a shorter distance from the optical axis than the servo-signal-detecting photodetector elements, wherein the pair of the servo-signal-detecting photodetector elements and the signal-detecting photodetector element are integrated (see Figure 6, element 26); in regard to claim 19, that the signal-detecting photodetector element is positioned closer to one of the servo-signal-detecting photodetector elements (see Figures 6 & 7); in regard to claim 20, that the signal-detecting photodetector element is provided in substantially a same plane as the emission point (see Figure 6, element 29); and in regard to claim 21, that the signal-detecting photodetector element is divided into a plurality of detecting sections having substantially equal areas (see Figure 7, elements 32 & 33).

However, Yamazaki does not explicitly disclose: in regard to claims 17 & 18, that the signal-detecting photodetector element has a light-receiving area smaller than a light-receiving area of the servo-signal-detecting photodetector elements.

Hasegawa et al. disclose a signal-detecting photodetector (Figure 2, elements 3a & 3b) having a light-receiving area smaller than a light-receiving area of servo-signal-detecting photodetector elements (4a & 4b). It would have been obvious to one of ordinary skill in the art at the time of the invention by the Applicant to have applied the teachings of Hasegawa et al. to

the device of Yamazaki, the motivation being to reduce the space consumption and weight of the optical device (see column 1, lines 33-45).

*Response to Arguments*

17. Applicant's arguments filed March 28, 2005 have been fully considered but they are not persuasive.

a. The Applicant argues on page 7, last paragraph that "Yamazaki fails to disclose or suggest an emitted beam dividing portion that functions both to divide an emitted light beam from a laser element and to diffract a light beam reflected by a recording medium". The Examiner disagrees. Yamazaki discloses an emitted beam dividing portion (28b) for dividing an emitted light beam from the laser element into a main beam and two sub beams. Note that Figure 2, element 8a is a grating that divides the laser beam into 0-order, +1-order & -1-order beams (see column 2, lines 1-7). Figure 6 is an improvement of Yamazaki's invention over the prior art shown in Figure 2; therefore, element 28b of Figure 6 is understood to have the same property as element 8a of Figure 2. Yamazaki also discloses that the emitted beam dividing portion (28b) diffracts a light beam reflected by a recording medium, as clearly shown in Figure 6.

b. The Applicant argues on page 8, paragraph 2 that "Yamazaki does not anticipate claim 16 for at least the reasons noted above". The Examiner disagrees for the same reasons noted in item 17a above.

c. Applicant's arguments regarding claims 2-9, 11 & 17-21 fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a

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patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

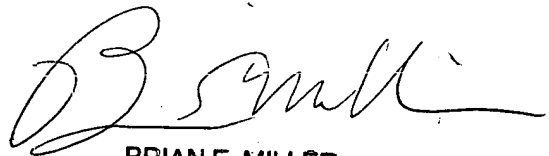
*Conclusion*

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Vincent Agustin whose telephone number is 571-272-7567. The examiner can normally be reached on Monday-Friday 9:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Thi Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter Vincent Agustin  
Art Unit 2652



BRIAN E. MILLER  
PRIMARY EXAMINER